Review Problems for Exam 1
MATH 1850, Spring 2013

1. On a circle of radius 13 km, how long is an arc that subtends a central angle of 45°?

2. Either $\sin x, \cos x$, or $\tan x$ is given. Find the other two if x lies in the specified interval.
$$\sin x = -\frac{7}{25}, \quad x \in \left[\pi, \frac{3\pi}{2}\right]$$

3. Express the given quantity in terms of $\sin x$ and $\cos x$.
$$\cos(\frac{3\pi}{2} + x)$$

4. A triangle has sides $a = 5$ and $b = 6$ and angle $C = 60°$. Find the length of the side c.

5. Sketch of graphs of the exponential functions on the same coordinate plane.
$$y = 2^x - 2, \qquad y = 2^{-x} - 2$$

6. Simplify using the laws of exponents.
$$2^{\sqrt{5}} \cdot 3^{\sqrt{5}}$$

7. Find the domain and range of the function $g(t) = \sqrt{1 + 9^{-t}}$

8. The population of a city is 100,000 and is increasing at a rate of 3.75% each year. Approximately when will the population reach 200,000?

9. Let $f(x) = 5x^3 + 1$. Find $f^{-1}(x)$ and identify the domain and range of $f^{-1}(x)$. To check the answer, determine whether $f(f^{-1}(x)) = f^{-1}(f(x)) = x$.

10. Simplify using the properties of logarithms.
$$\ln(\cos\theta) - \ln(\frac{\cos\theta}{6})$$

11. Solve for y in terms of t.
$$\ln(y - 31) = 5t$$

12. Solve for y in terms of x.
$$\ln(y - 9) - \ln 6 = x + \ln x$$

13. HW 4 - Sec 2.2, Question no. 2.

14. Find the limit.
$$\lim_{t\to 5} 9(t-8)(t-4)$$

15. Find the limit.
$$\lim_{h\to 0} \frac{7}{\sqrt{7h+4}+4}$$

16. Find the limit.
$$\lim_{t\to 8} \frac{t^2+3t-88}{t^2-64}$$

17. Use the following function to answer the following questions.
$$f(x) = \begin{cases} x^3, & x \neq 1 \\ \\ -3, & x = -1 \end{cases}$$
(a) Find $\lim_{x\to 1^+} f(x)$, (b) $\lim_{x\to 1^-} f(x)$, (c) Does $\lim_{x\to 4} f(x)$ exist? If so, what is it? If not, why not?

18. Find the limit.
$$\lim_{\theta\to 0} \frac{3\sin\sqrt{4}\theta}{\sqrt{4}\theta}$$

19. Find the limit.
$$\lim_{x\to 0} \frac{\tan 5x}{\sin 6x}$$

20. HW 6 - Sec 2.5, Question no. 1.

21. Determine the point(s) at which the given function $f(x)$ is continuous.
$$f(x) = \frac{11}{x-13} - 6x$$

22. Define $f(4)$ in a way that extends $f(s) = \frac{s^3-64}{s^2-16}$ to be continuous at $s = 4$.

23. Find the limit of the rational function (a) as $x \to \infty$ and (b) as $x \to -\infty$.
$$h(x) = \frac{9x^4}{7x^4+11x^3+6x^2}$$

24. Find the horizontal and vertical asymptotes of $f(x)$. Then graph $f(x)$.
$$f(x) = \frac{3}{x-5}$$

25. Find the horizontal, vertical and oblique asymptotes.
$$y = \frac{x^2+3}{x}$$